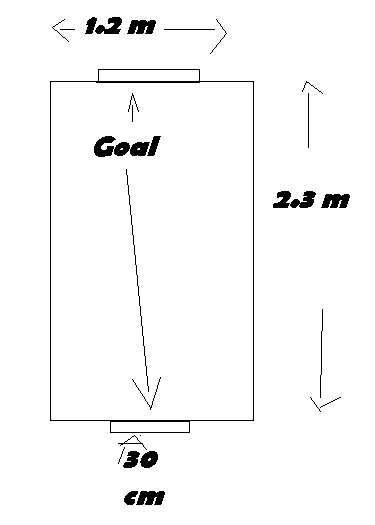
THE MATHEMATICS OF AIR HOCKEY

**Air hockey is a popular game of sliding the puck in the hole. Similar to Tennis and Football.**  **It is played on a table top with one player at either end.**

**Each player holds a small mallet in their hand and uses it to hit the disc, known as a puck across the table onto the opponent’s goal. The puck travels when the air is pushed through small holes in the table reducing the friction between the puck and table. It then increases the speed of the puck enabling it to travel for a further or stronger distance as you swipe the puck across.**

**In the diagram to the right displays the dimensions of the hockey table.**

**Best known strategy is the bank shot. It’s when the put is hit against the wall and deflects of to the goal line. It deflects of the wall, it leaves at the same angle at which it approached the wall. In other words, a1 = a2.**

**This known fact allows us to perform calculations involving the trajectory of the puck, using the properties of similar triangles.**

Q1 Mike hits the puck when it is at P, and banks against the wall at X, 40 cm from the corner of the table. The puck deflects off the right wall, and hits the other end of the table at O.

1. Why is AX = 1.6cm?

* It shows in the diagram that the total length of the table is measured 2.3m.Where Mike hits the puck from a distance to the table is 0.3m .The deflected part of X where it reaches point B is measured 0.4m. By subtracting the total length from the length shot from the puck.

(proof)

0.3+0.4=0.7

2.3-0.7=1.6

1. Finding the length of [AP].

* The gap that Mike left from the wall to the shot he made from the puck to the total minus the total width of the table.

(proof)

1.2m – 0.2 = 1.0m

1. Explaining why triangles PAX and OBX are similar.

* It is because both angles are similar.

1. Length of OB.

* It is 0.3 cm judging by the diagram.

1. Did the puck go into the opponent’s goal?

* No it didn’t. The angle is all wrong. If he had shot much harder he would have scored an own goal judging by the deflections of my view.

Q2 Mike wants to find the point X on the right wall he needs to aim at so that the puck will deflect into the middle of the opponent’s goal (i.e..., so that OB = 0.6 m). Let the distance BX = X metres.

Q3 Mike hits the puck when it is at P, and banks it against the left wall 45 cm from the corner as shown on the image.

Calculating the trajectory of the puck as it moves around the table. Where do you suppose the puck will end up?

(**A trajectory is the angle made with the horizontal when a projectile is fired.)**

Once you draw the actual figure on paper with the right measurements, Mark each point and draw every length from it’s side an from inside the table. Mark From point P to 0.45 m and draw the angle. By there you could know the angle from point P to o.45 m. There you see that from point 0.45m draw the angle of which it deflects.

There shown that the Puck will end up deflecting back.

Q4 From point P, Mike wants to hit a “double rank” shot. In other words, he wants to deflect the puck right off the wall, then off the left wall, and then into the middle of the opponents goal.

AX = Xm.

Using the Pythagorean Theorem.

From Point P to A

1.2-0.3 = 0.9(sq)

Root of 0.9(sq) that gives you 0.9m which is Xm

Marking Point P to X gives you the length of the shot that was hit on the right wall. And measure the angle which he hit in. The same thing goes if he started hitting from the left wall to right.

Q5 Repeat 4, in the case that the puck is deflected off the left wall first, then the right wall.

It goes with the same answer as question 4, they are both equiangular but have different portions of sides and angels..

They all equal to the same area.